US 20100090532A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2010/0090532 A1

(43) Pub. Date: Apr. 15, 2010

Shelton et al.

(54) **FREQUENCY RESPONSIVE CHARGE SUSTAINING CONTROL OF ELECTRICITY STORAGE SYSTEMS FOR ANCILLARY SERVICES ON AN ELECTRICAL POWER GRID**

(75) Inventors: **John C. Shelton**, Arlington, VA (US); **Praveen H. Kathpal**, Arlington, VA (US)

Correspondence Address:
BUCHANAN, INGERSOLL & ROONEY PC
POST OFFICE BOX 1404
ALEXANDRIA, VA 22313-1404 (US)

(73) Assignee: **THE AES CORPORATION**, Arlington, VA (US)

(21) Appl. No.: **12/248,106**

(22) Filed: **Oct. 9, 2008**

Publication Classification

(51) **Int. Cl.**
H02J 3/28 (2006.01)

(52) **U.S. Cl.** **307/46**

(57) **ABSTRACT**

Systems, apparatus, and methods are provided for maintaining the state of charge of energy storage devices such as batteries, flywheel, capacitors, or other technologies that are energetically coupled with the electricity grid to support ancillary services. To reliably respond to requests to regulate the grid, the charge on the energy storage device is sustained or restored to a specified range in a manner that optimizes the readiness of the energy storage device to supply ancillary services in light of the condition of the grid. A state of charge (SOC) of the energy storage device and the grid frequency may be monitored. When a request from the operator to regulate the grid frequency is not being serviced, the charge of the energy storage device may be increased or decreased so that the charge may be sustained within the specific range. Once the SOC falls outside of the first range, charge may be added to or removed from the energy storage device when the grid frequency has appropriate values, e.g. if the grid frequency is respectively above a first setpoint or below a second setpoint.